

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

17. (Currently Amended): ~~A Device~~ device for the detection of at least one ligand contained in a sample that is to be analyzed, ~~with,~~ said device comprising:

an optical waveguide, on the surface of which several detection fields are located, in which ~~individual~~ receptors are directly or indirectly immobilized, wherein ~~which,~~ when ~~it~~ each receptor comes into contact with ~~the~~ a ligand, the receptor forms a specific bond with the ligand, ~~with,~~

at least one optical source of radiation for injecting excitation radiation into the waveguide, the radiation being used for exciting the emission of luminescence radiation as a function of the bonding of the ligand to the receptor; ~~and~~

~~with~~ a semiconductor chip that has at least one radiation receiver on a semiconductor substrate for ~~the~~ each individual detection ~~fields~~ field to detect the luminescence radiation, ~~characterized by the fact that~~ wherein:

the waveguide is monolithically integrated with the semiconductor substrate or is ~~located~~ in the form of a waveguide layer located on the semiconductor chip; ~~and that~~

the radiation ~~receivers~~ receiver associated with ~~the~~ each detection ~~fields~~ field ~~are~~ is integrated into the semiconductor substrate facing the detection ~~fields~~ field directly on the back side of the waveguide facing away from the detection ~~fields~~ field.

18. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that the topography of the~~ wherein the semiconductor chip, ~~to prevent the undesirable extortion of light from the waveguide, is realized so that the~~ includes a boundary surface opposite the ~~at least one receptor~~ receptors between the semiconductor chip and the waveguide, ~~runs~~ the boundary surface running between two planes that are oriented parallel to the plane of extension of the semiconductor chip, ~~whereby~~ wherein the distance between ~~said~~ the two planes is less than the wavelength of the excitation radiation, ~~in particular less than one half, preferably one fourth and optionally one eighth of the wavelength of the excitation radiation.~~

19. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that wherein~~ the semiconductor chip, laterally next to the waveguide, has ~~structures for an~~ electronic circuit.

20. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that wherein:~~

between the semiconductor chip and the waveguide there is an intermediate layer, the optical index of refraction of which is less than that of the waveguide; ~~that~~

~~a side of~~ the intermediate layer ~~has the negative shape of the adjacent the semiconductor chip, to which it is directly adjacent on~~ conforms to a surface of the semiconductor chip; ~~and that the front~~ a side of the intermediate layer that faces away from the semiconductor chip and is directly adjacent to the waveguide is essentially plane.

21. (Currently Amended): The device ~~as recited in~~ of claim ~~17~~ 20, ~~characterized by the fact that wherein~~ the intermediate layer is ~~realized in the form of~~ an adhesive coating, ~~preferably in the form of a polymer coating.~~

22. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that wherein~~ the waveguide is connected with the semiconductor chip ~~by means of~~ at least at one bonding point.

23. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that wherein~~ the waveguide is ~~realized in the form of~~ a thin-film layer ~~that preferably consists of a transparent polymer material, in particular polystyrene.~~

24. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that wherein~~ the waveguide is ~~formed by~~ a metal oxide layer, ~~in particular a silicon dioxide layer or a tantalum pentoxide layer.~~

25. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that wherein~~ the optical radiation source is ~~realized in the form of~~ a semiconductor radiation source ~~and that~~ is integrated into the semiconductor chip.

26. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that for the injection of the excitation radiation into the waveguide, further including an optical injection system is provided in the emission area of the optical radiation source, which system is preferably realized in one piece with the waveguide and in particular has at least one prism, an optical lattice and/or a deflecting mirror. for deflecting optical radiation emitted by the optical radiation source to the waveguide.~~

27. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that wherein~~ the detection fields are at some distance from one another and are positioned relative to the radiation receivers so ~~that the individual each radiation receivers receiver receive receives~~ essentially no luminescence radiation from a detection field of ~~another~~ an other radiation receiver.

28. (Currently Amended): The device ~~as recited in~~ of claim 17, ~~characterized by the fact that wherein:~~

the ~~at least one receptor is~~ receptors are located in the an interior cavity of a flow-through measurement chamber that has at least one inlet opening and one outlet opening; ~~and that the semiconductor chip preferably forms defines~~ a wall area of the flow-through measurement chamber.

29. (Currently Amended): The device ~~as recited in~~ of claim ~~17~~ 28, ~~further including a heating and/or cooling device for characterized by the fact that to control the controlling a~~ temperature of the flow-through measurement chamber ~~a heating and/or cooling device is provided, which preferably has a Peltier element.~~

30. (Currently Amended): The device ~~as recited in~~ of claim ~~17~~ 28, ~~characterized by the fact that in wherein~~ the flow-through measurement chamber ~~there is~~ includes at least one reagent and/or reaction partner for the detection of the bonding of ~~the~~ at least one ligand to ~~the~~ at least one receptor.

31. (New): The device of claim 18, wherein the distance between the two planes is less than either one-half, one-fourth or one-eighth of the wavelength of the excitation radiation.

32. (New): The device of claim 21, wherein the adhesive coating is a polymer coating.

33. (New): The device of claim 23, wherein the polymer material is polystyrene.

34. (New): The device of claim 24, wherein the metal oxide layer is either a silicone dioxide layer or a tantalum pentoxide layer.

35. (New): The device of claim 26, wherein:
the optical injection system is part of the waveguide; and
the optical injection system includes at least one of the following: a prism, an optical lattice and/or a defecting mirror.

36. (New): The device of claim 29, wherein the heating and/or cooling device is a Peltier element.